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January 9, 1995

Mr. William Caton, Acting Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

94-102

Re: CC Docket No. 94-104
RM-8143

Dear Mr. Caton:

Herewith transmitted, on behalf of United States Cellular Corporation are an original and four copies of its Comments in the above-referenced proceeding.

In the event there are any questions concerning this matter, please communicate with this office.

Very truly yours,

Peter M. Connolly

Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Revision of the Commission's Rules	)	CC Docket No. 94-102
to ensure Compatibility with	)	RM-8143
enhanced 911 emergency calling systems	)	

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Summary

The Notice of Proposed Rulemaking in this proceeding proposes to impose mandatory federal standards on all wireless carriers in the provision of 911 service. United States Cellular Corporation ("USCC") shares the FCC's goals, which include: (1) universal access to 911 emergency service at any time; (2) priority handling of 911 calls; (3) automatic detection of a 911 user's location and communication of that location to the Public Safety Answering Point ("PSAP"); and (4) a re-ring and call back capability for the PSAP in the event of a cut-off of a mobile call.

However, USCC requests that in formulating standards the FCC take into account the difficulties rural cellular licensees will have in providing the full range of 911 services as rapidly as the Commission would wish to have them provided.

Rural markets, which often have single, omnidirectional cells serving large areas with low population densities, will present unique difficulties in implementing enhanced 911 services. The NPRM does not take those difficulties adequately into account.

The FCC should consider exempting rural cellular providers from certain of the proposed requirements, or delaying their imposition in rural areas.

USCC also strongly supports the proposal of the Cellular Telephone Industry Association to create an advisory committee, comprised of representatives of all affected interests and the government, to make recommendations to the Commission.

Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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Comments
of
United States Cellular Corporation

A. Statement of Interest.

1. United States Cellular Corporation ("USCC") manages and invests in cellular systems throughout the nation. USCC is the country's seventh largest cellular telephone company and owns or has the right to purchase cellular interests in 75 Metropolitan Statistical Areas ("MSAs") and 133 Rural Service Areas ("RSAs"). Those markets include a population of over 24.4 million people. Moreover, as of September 30, 1994 through subsidiaries, USCC operated systems in 142 different markets. USCC shares are traded on the American Stock Exchange and the company is an 81% owned subsidiary of Telephone and Data Systems, Inc. ("TDS").

2. In Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, CC Docket No. 94-102, RM-8143, Notice of Proposed Rulemaking and Notice of Inquiry, Released October 19, 1994, ("NPRM") the Commission initiated this proceeding. The NPRM focuses, in part,

on the obligations of wireless mobile telecommunications licensees to make their networks compatible with "Enhanced 911" facilities. According to the NPRM, part of this compatibility includes special obligations on the wireless operator. Essentially the rules require wireless systems to automatically send 911 calls to Public Safety Answering Points ("PSAPs") along with information helpful in emergency situations. USCC has substantial experience and expertise as a wireless communications provider. Furthermore, USCC will be subject to the 911 compatibility rules as they are presently proposed in the NPRM. For these reasons, USCC believes it is important to participate in the instant proceeding and asks that its views be considered carefully along with those of other cellular providers.

B. Focus of the Proceeding and USCC Comments

3. The NPRM addresses 911 issues related to both private branch exchanges and wireless carriers. Specifically in connection with wireless systems, the NPRM requests comment on what kinds of wireless carriers should be required to provide access to emergency services through 911. The NPRM then proposes to impose mandatory Federal standards on all wireless carriers providing 911 service in order to assure national uniformity. These standards generally mirror the 911 capabilities of the wired public switched telephone network. Among other things, the proposed standards include the following: (1) universal access to 911 emergency services through any mobile telephone at any time; (2) priority handling of 911

calls; (3) automatic detection of a user's location and immediate communication of the location to the PSAP; and (4) a re-ring and user call back capability for the PSAP in the event of the cut-off of a mobile call. Some aspects of the Commission's proposed rules are quite elaborate. For example, in connection with the automatic detection of a caller's location, the NPRM proposes a three phase process, implemented over a five year period. Other requirements, such as the rule giving 911 calls priority over other incoming calls, are implemented within a year.

4. Overall, USCC supports universal wireless 911 emergency access and the development of all the services and capabilities envisioned by the NPRM. In areas where PSAPs are available, USCC already provides the users of its system automatic 911 access to emergency services. In fact, 911 is available to any operating mobile phone in those markets free of charge, regardless of whether the mobile phone is service initialized or not. Moreover, USCC would like to provide PSAPs the kind of data proposed by the NPRM. Unfortunately, USCC knows of no cellular based technology presently available that will automatically provide such information in a quick and easy manner. For example, providing user location information is a problem that will vary in difficulty depending on a number of factors. Such things as market size, topography and cellular system design all have an impact. Moreover, the ability of a carrier and its subscribers to afford the necessary technology is also a consideration. For this reason, while USCC is eager to

be able to provide such 911 services, the present state of cellular technology may not permit cellular carriers to do so in all locations. USCC's comments below focus on obstacles it faces in many of its markets today in providing the full range of emergency services the NPRM seeks to provide . Any technology or standard the Commission decides to adopt needs to take account these circumstances in order to allow carriers a reasonable opportunity to comply with the new rules.

C. USCC Service Areas

5. Many of the markets served by USCC are rural with a low population density. For example, in one USCC service area, Oregon RSA #2, there are approximately 6.1 persons per square mile.[1] In locations with such low population densities, the most efficient and economical manner to provide service is with cell sites that cover large areas. In the Oregon 2 system, for example, one cell site provides coverage to 1,950 square miles, most of it without any other USCC cell coverage. Such conditions are very different from those found in large, high density urban markets. As a result, the technical configuration of systems like that in Oregon RSA 2 are significantly different from those in urban areas.

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[1] To put this number in perspective, according to 1990 Census data, the population density of the counties including some of the major cities in the United States are as follows: Houston -- 1630 people per square mile; Minneapolis -- 1853 people per square mile; Los Angeles -- 2,183 people per square mile; Chicago -- 5,396 people per square mile; Boston -- 11,252 people per square miles; Philadelphia -- 11,745 people per square mile; and New York -- 53,126 people per square mile.

6. For example, in a densely populated area, 1,900 square miles could contain over 600 cells, with the service in each cell divided into six discrete sectors. This would essentially divide the area into 3,600 relatively distinct coverage areas of approximately one-half square mile each. Moreover, a great number of these coverage areas would overlap, thus potentially allowing a mobile user's signal to be received in as many as six different base station sectors. By analyzing how strongly the signal is received in each sector, the location of a mobile user can be narrowed down to a particular area of coverage. However, at the present time, there is no hardware or software that will automatically conduct such an analysis. Furthermore, as is the case in Oregon 2 and other RSAs, where there is no sectorization and a single base station provides coverage to 1900 square miles, none of this information is available anyway. Consequently, identifying even the general direction of a mobile user's location in markets like Oregon RSA 2 is presently impossible.

7. Unfortunately, the proposals in the NPRM do not reflect an adequate understanding of the differences between urban and rural markets. For example, the NPRM appears to assume that cell sectorization is so prevalent in the industry that all cell sites can provide at least some user location information. There are two flaws in this assumption. First, where sectorization exists, the information that can be provided is often very limited and will not by itself provide much more than the general direction of a user's

signal. Second, and perhaps most importantly, in the markets that USCC provides service, cell sectorization is very rare. The population density and the demand for cellular service have not required sectorization. Rather, almost all USCC's cells are omnidirectional.

8. Moreover, USCC makes extensive use of Cell Extenders ("CEs") which have almost the opposite effect of sectorization, by making it more difficult to determine the point of origination of a mobile call. CEs are used to provide coverage to areas with low population densities in a manner that avoids the cost of constructing a new "full service" cell. CEs essentially extend the signal of a cellular base station into areas otherwise without service. To the cellular switch, all the traffic on a CE appears as nothing more than traffic within the base station's normal coverage area. In fact, the CE's coverage may extend many miles beyond the base station's contours. Nevertheless, the system typically views the base station/CE traffic as belonging to one individual cell, without any distinction as to where the call originates. In USCC's Oregon RSA 3 system for example, USCC has a base station and CE that cover approximately 1,500 square miles. Until the technology exists to allow single cells operating in rural areas precisely to determine signal direction and location, the FCC should not impose onerous and costly 911 requirements on cellular providers.

D. Circumstances Impacting 911 Service in Non-Urban Locations

9. The circumstances USCC faces in markets like Oregon RSA 2 and RSA 3 are not uncommon. To some extent, these markets are typical of many systems in rural low population density areas. In determining its policy towards wireless 911 providers, USCC believes the Commission must take account of three basic realities of systems serving rural markets. First, the Commission cannot assume that low density rural markets will have technology in place that is in common use in urban markets, particularly technology intended to increase cell capacity. This not only includes cell sectorization but digital radio technology as well. There are some areas that will never need sectorization, Time Division Multiple Access, Code Division Multiple Access or any other similar technology simply to expand capacity. Furthermore, with the comparably small number of subscribers in such areas, installing such technology can drive the cost of cellular service beyond what most people can afford. Thus, the standards and deadlines eventually adopted by the Commission for wireless 911 service should not assume all markets will have either cell sectorization or digital radio facilities.

10. The second fact the Commission needs to consider in its wireless 911 policy is that many rural markets have large areas that have single cell service. This is in contrast to urban markets where some locations are served by several cells. This fact is of particular significance in connection with identifying a mobile

user's location. Any system or technology which relies on identifying a user's location through the use of multiple cell sites will be unable to operate in such an environment. Consequently, unless a technology exists which can identify a user's location from transmissions to a single cell, the Commission's standards on providing such information need to provide rural carriers with greater flexibility. The rules must either make the standards inapplicable to markets with low population densities or give such markets extended periods of time to come into compliance. Without such flexibility, wireless carriers in rural areas will not be able to comply with the new rules.

11. The third factor the Commission must consider in applying the proposed 911 standards to rural markets is the expense of complying with the standards. The subscriber base in rural areas is smaller and thus there are fewer cellular users to support the cost of new technology. With digital switches, cell sectorization and redundant cell coverage already in place, urban areas already have some of the infrastructure that can support the kind of 911 services envisioned by the NPRM. Thus, urban areas not only have a greater number of subscribers to share the costs, the costs may actually be lower per cell because of the technology that is already in place. This is another reason for the Commission to carefully consider how the proposed 911 rules apply to rural, sparsely populated locations. Again, the most appropriate solution

may be to exempt systems serving such areas from some of the more costly 911 features proposed in the NPRM or to extend the time for compliance.

E. General Factors to be Considered in 911 Standards

12. Besides the above considerations which are of particular concern in the rural areas, there are also a number of matters of general concern the Commission should consider in implementing 911 standards. First, no cellular carrier should be required to provide 911 service unless a local PSAP exists to receive emergency calls. Wireless 911 technology will be expensive for both a cellular carrier and ultimately for the carrier's subscribers. If the local authorities responsible for creating and maintaining a PSAP are unwilling to commit the time and resources necessary to create such a facility, local cellular carriers and their subscribers should not be subject to the Commission's 911 requirements. Without a real commitment by local emergency officials, the kind of 911 capabilities proposed by the NPRM are wasted.

13. Second, the Commission should try to protect cellular carriers from claims for damages by 911 users for calls misdirected through no fault of the carrier. Unlike wire based telecommunications, cellular service may be subject to interference from weather, terrain and other factors beyond the carrier's control. There are circumstances, for example, that can dramatically increase signal propagation and cause a mobile unit's

transmission to travel hundreds of miles to an out-of-market base station. Such events, while not common, do occur and could have a disastrous impact on 911 calls from a mobile user. A wireless carrier should not be held responsible for such events and the Commission should use any means within its power to protect carriers from liability.

F. USCC Supports a 911 Advisory Committee

14. The Cellular Telecommunications Industry Association ("CTIA") is calling for the Commission to create a wireless industry advisory committee on the 911 standards. USCC supports this idea and would be willing to participate and assist such a committee in establishing 911 technical standards. As these preliminary comments indicate, providing wireless 911 emergency services is a very complex issue, and is much more complex than the NPRM anticipates. An industry advisory committee composed of representatives from the Commission, the wireless industry and emergency service providers could address these complex issues more directly and efficiently than a notice and comment rule making proceeding. Also, if there is one idea which is now discredited in the regulatory process, it is that centrally directed "one size fits all" regulation should automatically be adopted as the solution to social problems USCC, like other cellular providers, wishes to provide its subscribers with the best 911 service it reasonably can. However, it should not be immediately subjected to uniform requirements which do not make sense for rural areas.

For those reasons USCC urges the Commission to adopt CTIA's proposal for a 911 advisory committee, which hopefully will determine where the public interest lies.

G. Conclusions.

15. USCC supports the Commission in its efforts to establish a uniform nationwide wireless 911 service. However, the NPRM underestimates the complexity of establishing 911 standards and the difficulty in implementing such standards in rural areas. USCC now believes that the Commission should consider either exempting systems serving areas with low population densities from its proposed standards or provide for a longer implementation time than the five years presently proposed. In any case, USCC supports referring the issue of 911 standards to a wireless industry advisory committee to analyze the complex issues involved and to recommend a course of action.

Respectfully submitted,

UNITED STATES CELLULAR CORPORATION

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January 9, 1995 Its Attorneys